Claim Amendments and Remarks

Kindly cancel Claims 42, 44, 48, 50, 53-54, 57-58, and 60.

Please enter new Claims 62 -.66.

New base Claim 62 is similar to rejected cancelled Claim 42, except it now includes the limitation that –the diameter of said chamber being not more than about 2.2 times the diameter of said inlet tube, so that gases entering said tubular chamber are swirled through said chamber at an accelerating rate to exit through said outlet..–

New base claim 63 is similar to rejected cancelled Claim 54, except it now includes, in addition to the new limitation in Claim 62, the additional limitation that –the combined interior diameter dimensions of said inlet tube and said chamber are less than about a third of the length of said chamber–.

New base method Claim 66 is similar to old rejected method Claim 60, except it now includes the additional limitation –providing an inlet attached to an engine and a chamber attached to said inlet, said chamber having a diameter of about 2.2 times the diameter of said inlet–.

Former base Claims 42, 54 and 60, now cancelled, were rejected under 35 USC 103 as unpatentable over Nakamura in view of Weiss and further in view of Ross. The applied references lack the ratios and geometry claimed as well as the positions of the elements and steps of the method recited..

Applicant submits that the additional structure, and methods now recited as limitations in the claims, particularly in the light of the test results previously submitted by the applicant,

which show the improved performance of applicant's device, demonstrate that applicant's invention satisfies a long felt need and provides a new and unexpected result, i.e. increasing engine performance, torque and horse power, over existing exhaust systems. These factors must be considered by the examiner in view of the holdings in *Dow Chemical Co. v. American Cyanamid Co.*, CA Fed. 1987, 816 F2d 617, 2 USPQ2d 1350, cert. Den. 108 Sct.149. Also, there is no suggestion or basis in the references to suggest the combinations of references made by the examiner, see *In re Valch*, 947 F2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991), and that is certainly true where the limitations related to the geometry, ratios and arrangement of the elements are not fairly shown or taught by the references.

Dependent Claims 43, 45-47, 49, and 51, are now dependent upon Claim 62 and include all of the limitations of that parent claim. Additionally, the flow cross-section area relationships recited in dependent Claims 45-46 are not discussed or remotely suggested in the references, nor is the angularity of the blade in the exhaust path, as recited in dependent Claim 49. These recitations are believe to independently distinguish over the references. Dependent Claims 52, 55-56, 59, and 65 are dependent upon Claim 63, and include all of the limitations of that parent claim. Dependent method Claim 59 includes the limitations of new method Claim 66.

The new Nakamura Japanese reference deals with removal of water from the exhaust system. While his vortical vane 38 spins the products of combustion, the abstract of the patent shows that this feature is designed to make the "heavy cooling water contained in exhaust gas...flow away and divided by ...centrifugal force" so that "on the other hand, exhaust gas flows straight and speedily from the expansion chamber toward the second inner cylinder 34.". From this explanation, it is clear that Nakamura doesn't swirl the gases through the chamber to the

outlet, except to the extent necessary within his first chamber to the extent that water is removed, and to permit the gas to flow straight through the chamber. Gas which is not entrained in the central stream will hit the baffle of the second chamber arranged against and not in the flow of exhaust (see the baffle of the wall of the second cylinder 28 which will direct the gas flow back toward the vane 38 situated to block the path of the gas). Applicant submits that with respect to the gases which reach this baffle, there is back pressure on the engine. In other words, while the water swirls, the gas does not. Even so, the relative diameter and length of the chamber a related to the inlet 25 does not fall within the limitation of applicant' present claims.

Weiss et al in no way anticipates the claim limitations. Weiss' chamber is monstrous when comparing his relative geometry of the diameter of the inlet to the diameter of the chamber. In Weiss, gases are intended to substantially expand and slow to muffle noise. It is submitted that the presence of expanding gas in the large chamber will create back pressure, rather than rapid exhaust of the gas. Ross likewise doesn't meet applicant's claimed geometry and ratio limitations, and, additionally, Ross has propellers rotating clockwise and counter-clockwise so that the gas flow is broken up and there is no smooth flow of gases; and there is bound to be back pressure on the engine from such an arrangement. This is further evident from the alternating disposition of the blades, i.e. one set arranged in the direction of flow and the next set directed in opposite the direction of flow, and Ross also places a deflector 28 in the direction of the gas flow to further block and agitate the gas stream. These factors bear upon the issue of whether there is back pressure on the engine caused by the design of the exhaust system - and it is clear that the restrictions and blockage in Ross does cause back pressure.

Where Weiss and Ross are designed to slow the flow of gas coming from an engine exhaust and the Japanese reference intends to separate heavy water from gas with a centrifuge, it would not be possible for a person or ordinary skill in the art to use these structures in combination to make the applicant's advance obvious. Add that factor to the present claimed geometry and ratios of applicant, as claimed, and, it is submitted, that Section 103 of the Act cannot realistically apply to the present invention.

Applicant submits that the claims as now presented recite patentable subject matter and distinguish over the references.

Respectfully submitted,

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ROTATABLE PROPELLER DRIVE ENGINE EXHAUST SYSTEM

Amendment dated 23 May 2006, Group Art Unit 2837

--(0018) As shown in the drawings, with particular reference to Figs. 1 - 2, and 5, the diameter of the chamber 18 should be no more than about 2.2 times the diameter of the inlet pipe 12, and the overall diameter of the interior of shell 16 should be about two times the diameter of the inlet pipe 12, so that the spun gasses 32, as indicated n Fig. 1 by the arrow, traveling through the chamber 18 exit in a swirling action at an accelerating rate when directed by the blades 30, angularly disposed toward the outlet 36. Also, as shown, the ratio of the length of the flow barrel or chamber 18 to the area of the inlet pipe 12 should be about .08. For example, if the area of the inlet pipe 12 is about 6.47 sq. inches, and the area of the flow barrel or chamber 18 is about 12.568 inches, the equation 12.568/6.47 results and will yield a ration of 1.9425, and when divided by the chamber length, for example, 24", the equation 1.9425/24 result, so the flow length ratio will be about .08. Also, as shown, the combined diameters of the inlet pipe 12 and the chamber 18 should not exceed about one-third the length of said chamber. As stated previously and shown, the blades 30 are preferably disposed at about a 30 degree spiral twist to direct combustion gases in a swirl-like path through said chamber toward said outlet pipe 36.--

(0019) It is found that the exemplary embodiments of the invention provide high performance propulsion mufflers that increase horsepower and/or fuel efficiency for internal combustion engines, while maintaining the sound level of the engine within acceptable levels. Without being limited by any particular theory, it is believed that as the exhaust gas enter the muffler, the

propeller forces the gas to rotate into a tightly spun vortex, as the gas expands in the expansion chamber. This facilitates the flow of the gasses through the expansion chamber, and through the outlet tube. This effect creates a vacuum, which draws more gasses from the exhaust source, increasing the exhaust throughput of the engine.

(0020) Relative to similar standard mufflers that do not have the propeller, it has been found that the horsepower of the engine can be increased by up to about 19%. In an embodiment, the horsepower was improved to between about 13 and about 19%. In another embodiment the fuel milage was increased by up to about 12% in city driving, and up to about 15% in highway driving. In a further embodiment, the fuel efficiency was improved to between about 5 to about 12% in the city. In yet another embodiment, the fuel efficiency was improved to between about 6 and about 15% on the highway. Vehicles that may benefit from such a muffler include trucks, automobiles, lawn mowers, boats, snowmobiles, power machinery, or other equipment driven by the internal combustion engine.